

# Lecture 05 - Feature Extraction

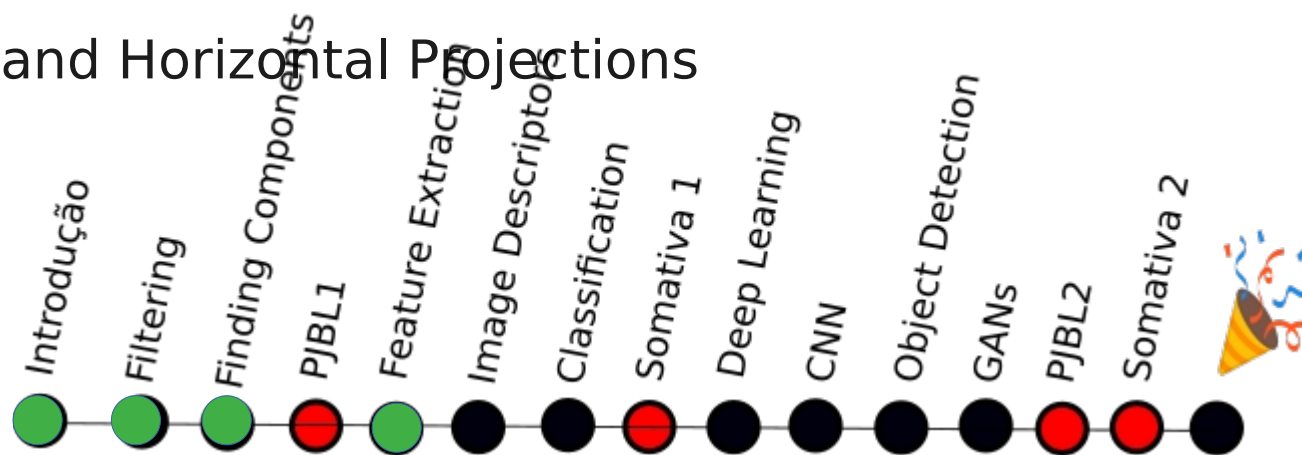
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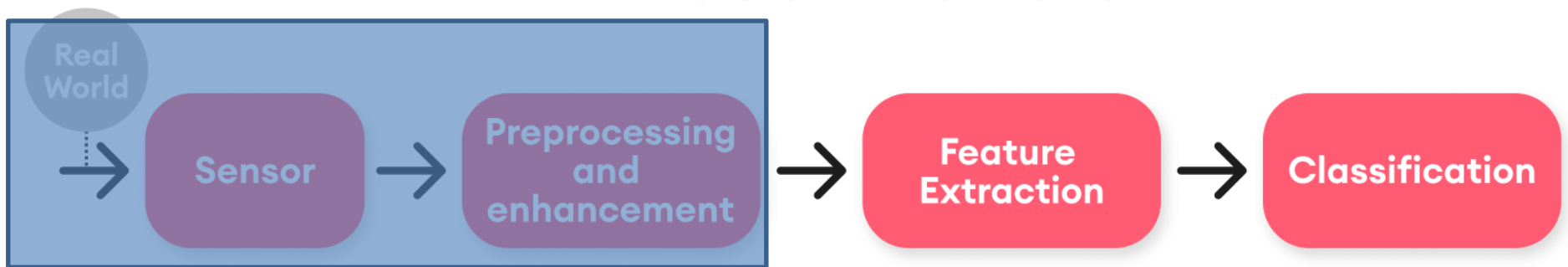
# Topics

- Discussion of PJBL #01
- Feature Extraction
  - Feature Vector
  - Feature Space
- Feature Engineering
- Image Descriptors
  - Vertical and Horizontal Projections
- Practice



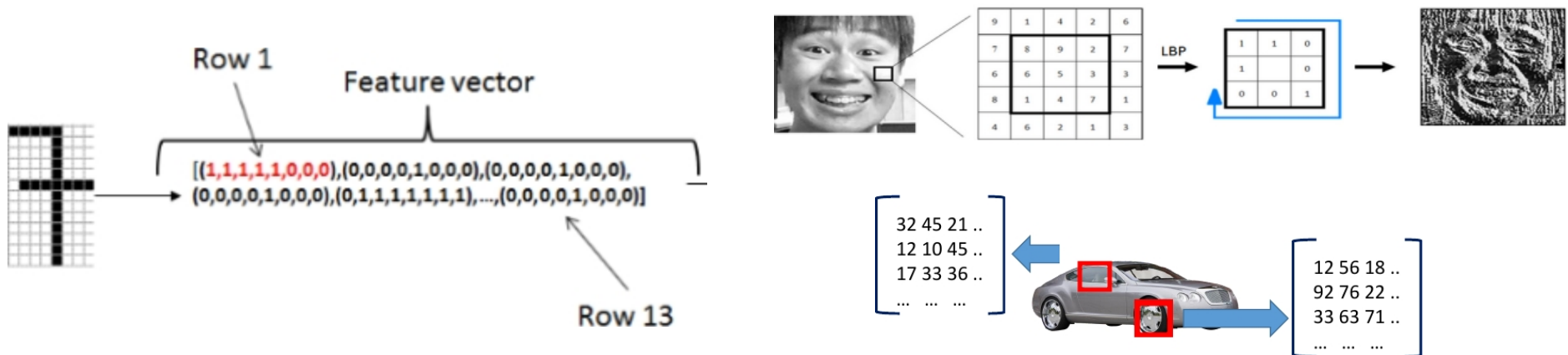
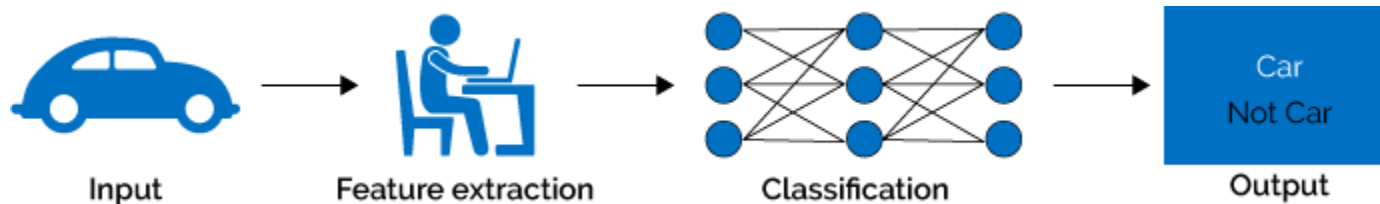
# Computer Vision & Pattern Recognition Pipeline

## PATTERN RECOGNITION SYSTEM



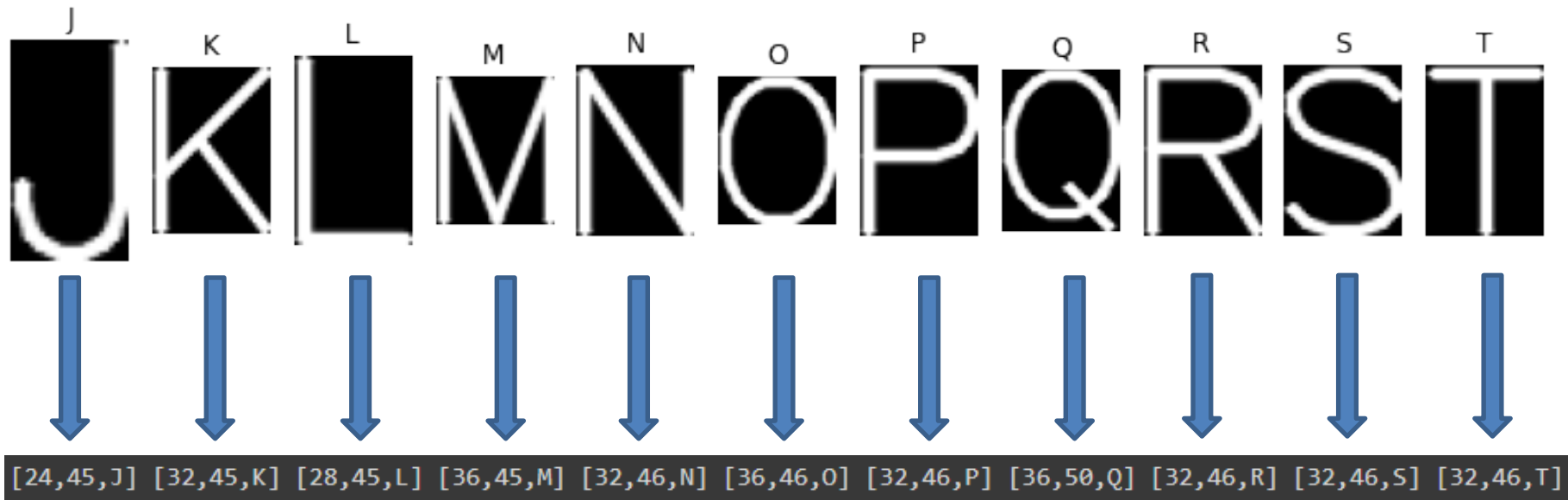
# Feature Extraction

- A feature descriptor translates high-dimensional data to a feature space
- A feature vector represents the input data produced by the feature descriptor
- Later, a machine learning model will learn the representations



# Feature Extraction

- Let's represent our image by its size, so an image  $I$  that belongs to class  $X$  is represented by:
  - $f(I, X) = [I.width, I.height, X]$

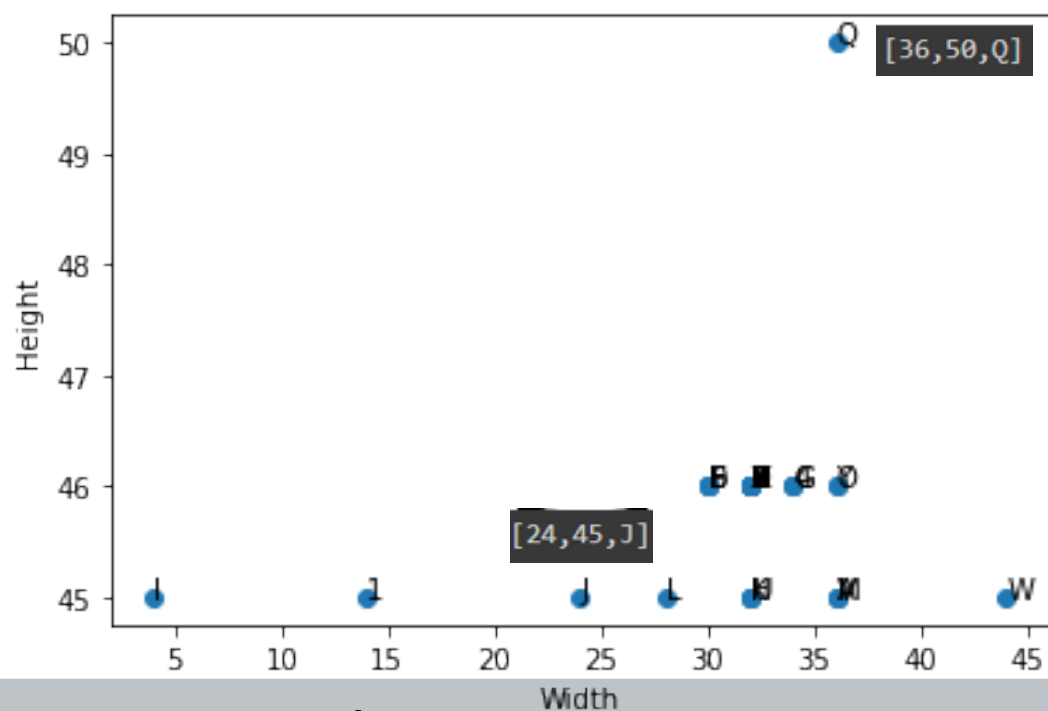


# Feature Vector

- Is the feature vector representative?

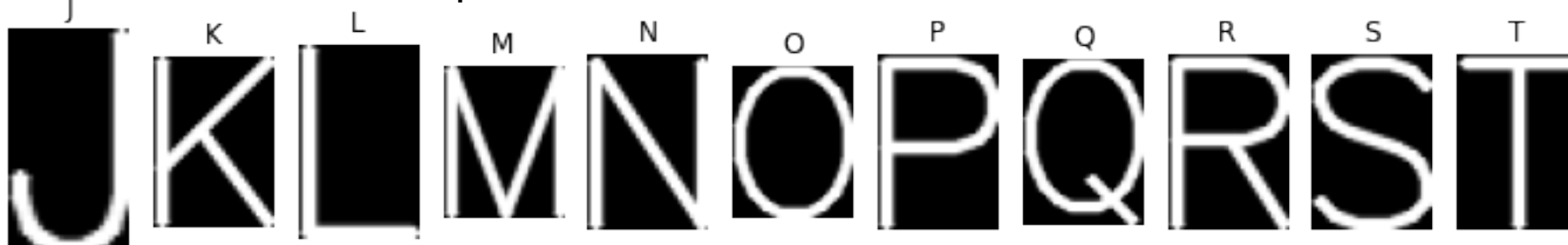


[24,45,J] [32,45,K] [28,45,L] [36,45,M] [32,46,N] [36,46,O] [32,46,P] [36,50,Q] [32,46,R] [32,46,S] [32,46,T]

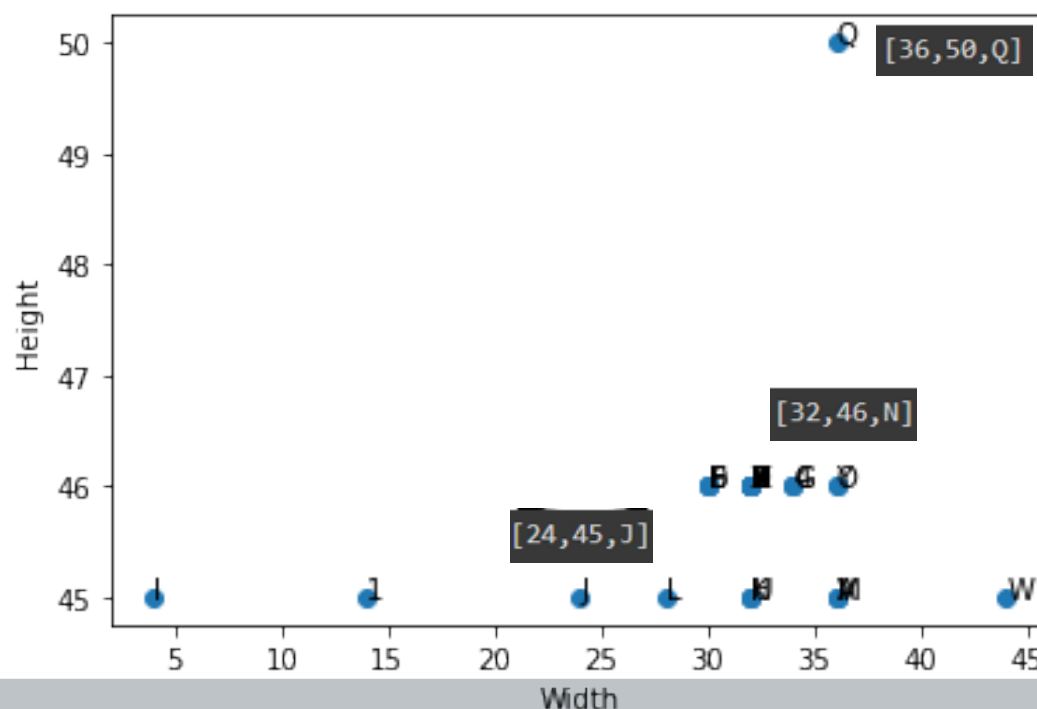


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[24,45,J] [32,45,K] [28,45,L] [36,45,M] [32,46,N] [36,46,O] [32,46,P] [36,50,Q] [32,46,R] [32,46,S] [32,46,T]

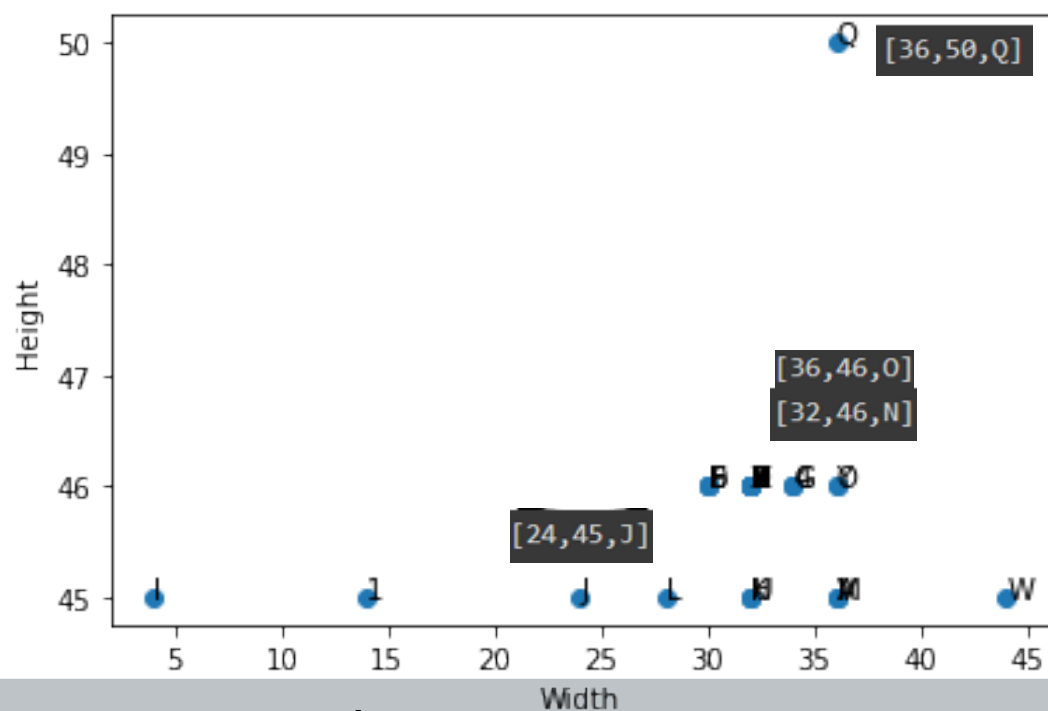


# Feature Vector

- Is the feature vector representative?



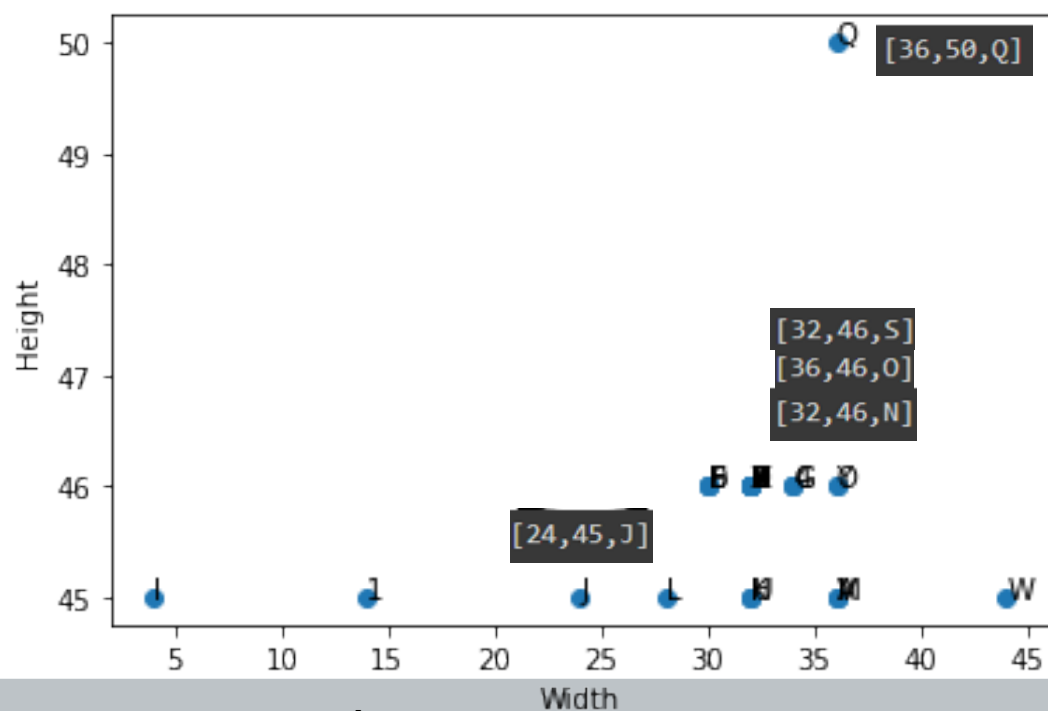
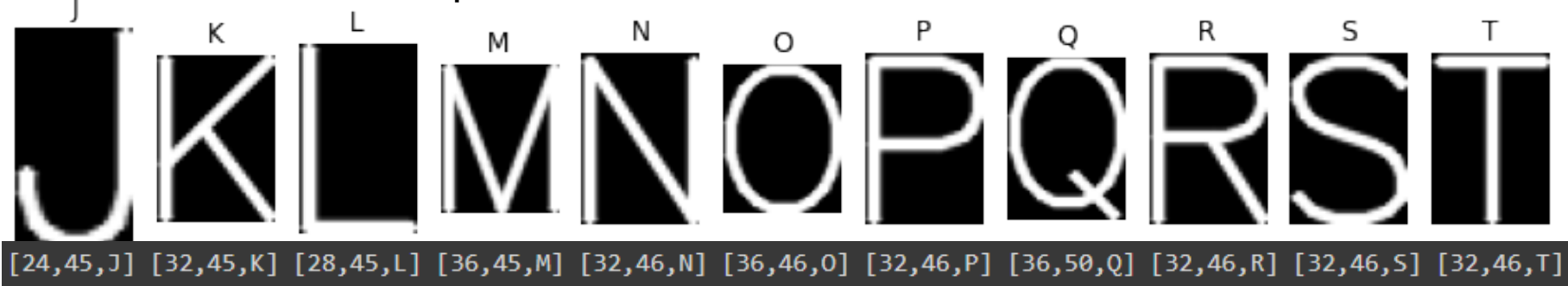
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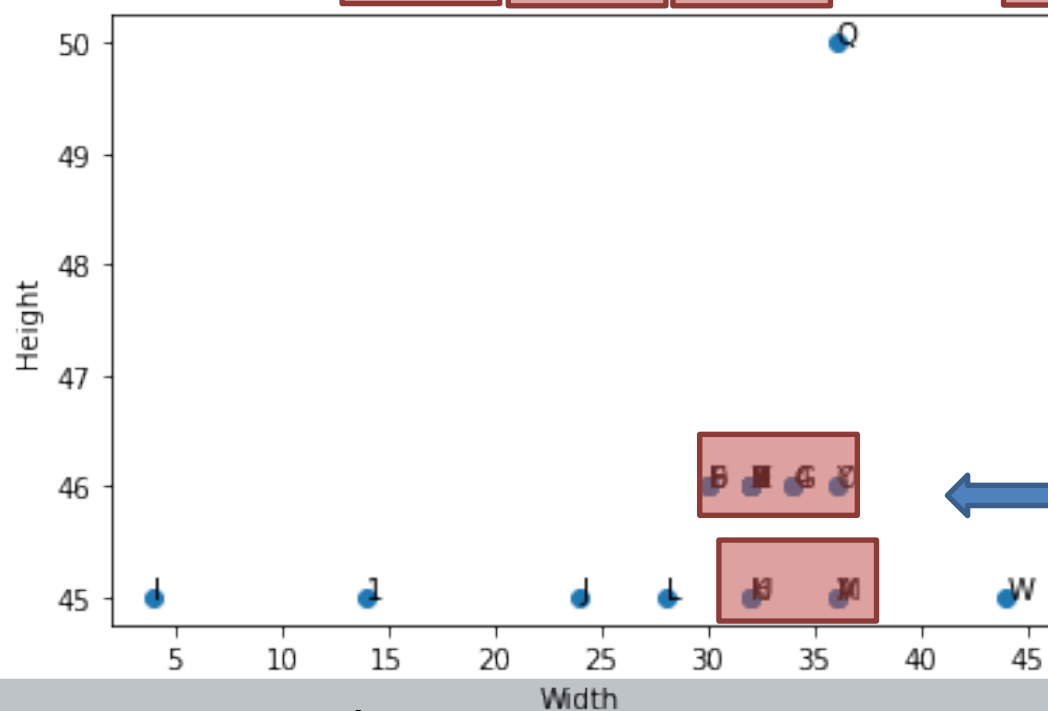
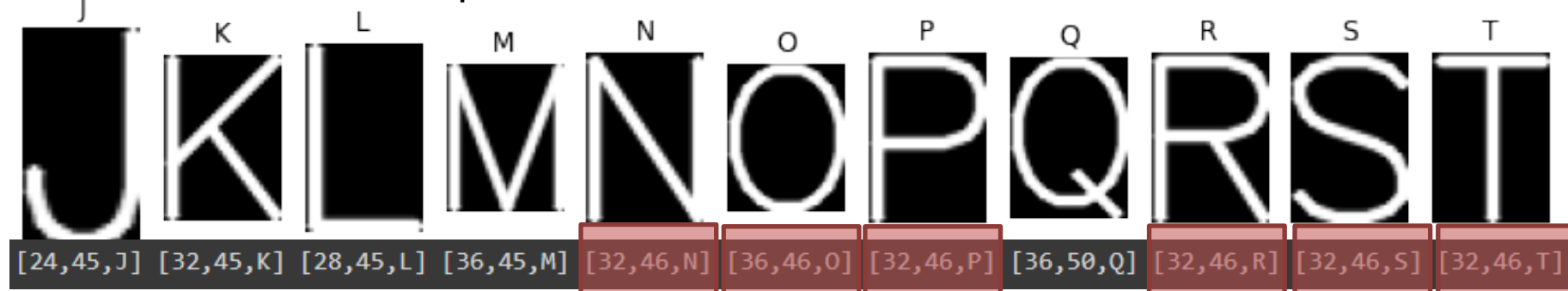
# Feature Vector

- Is the feature vector representative?



# Feature Vector

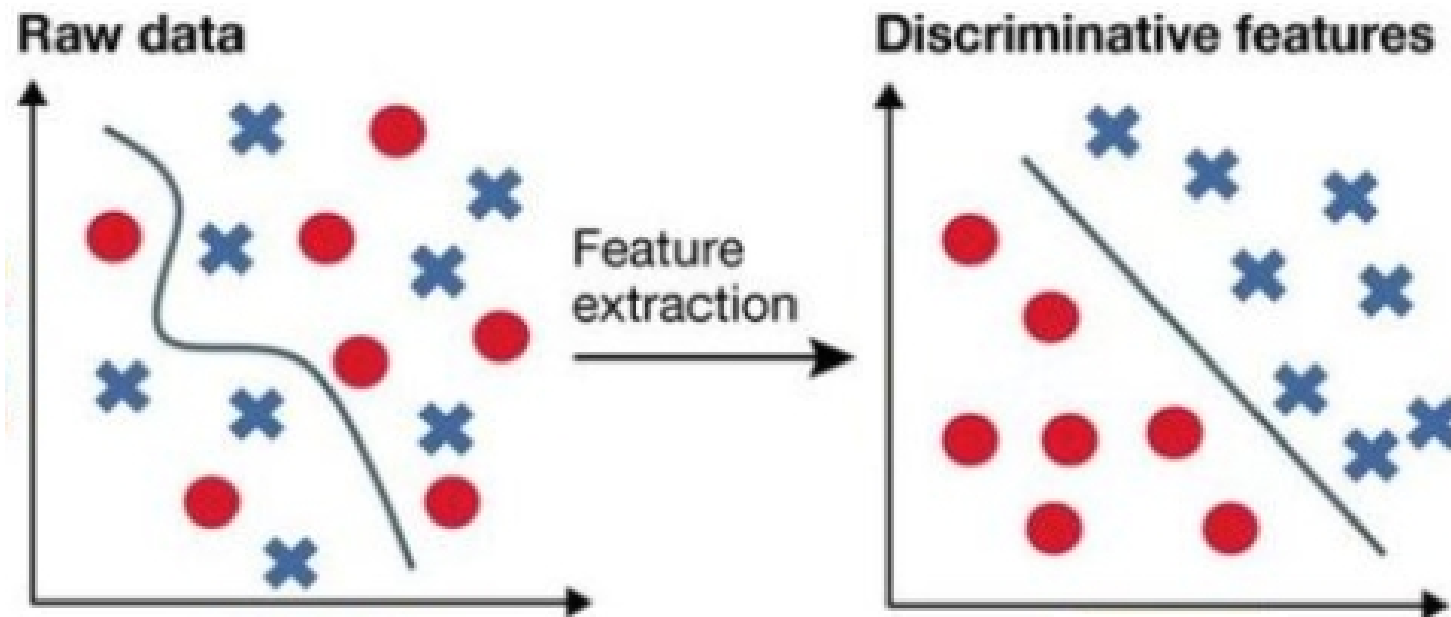
- Is the feature vector representative?



Non Discriminative

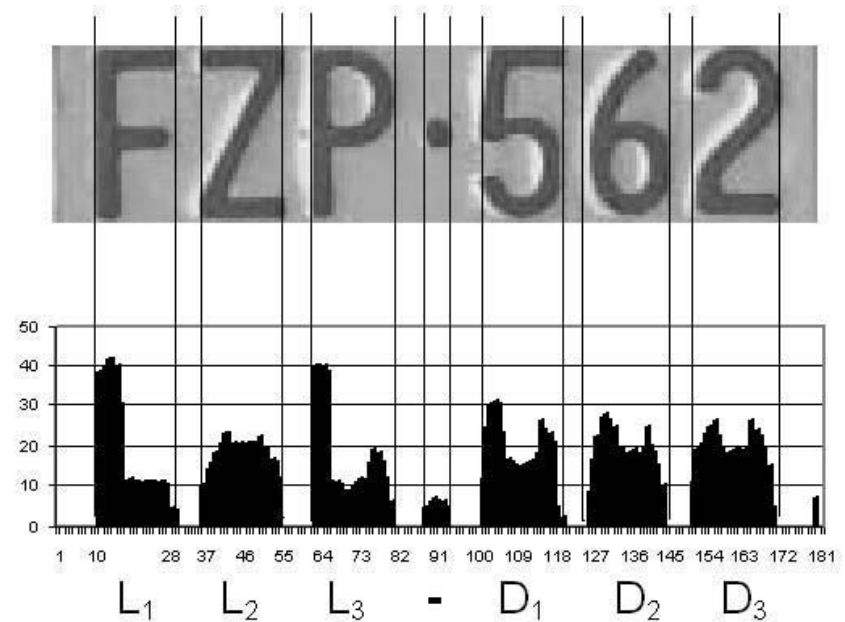
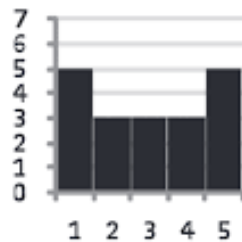
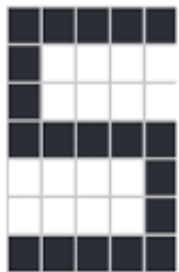
# Feature Engineering

- How to produce a discriminative feature space?
- Features must describe a singular characteristic of the problem for good generalization.



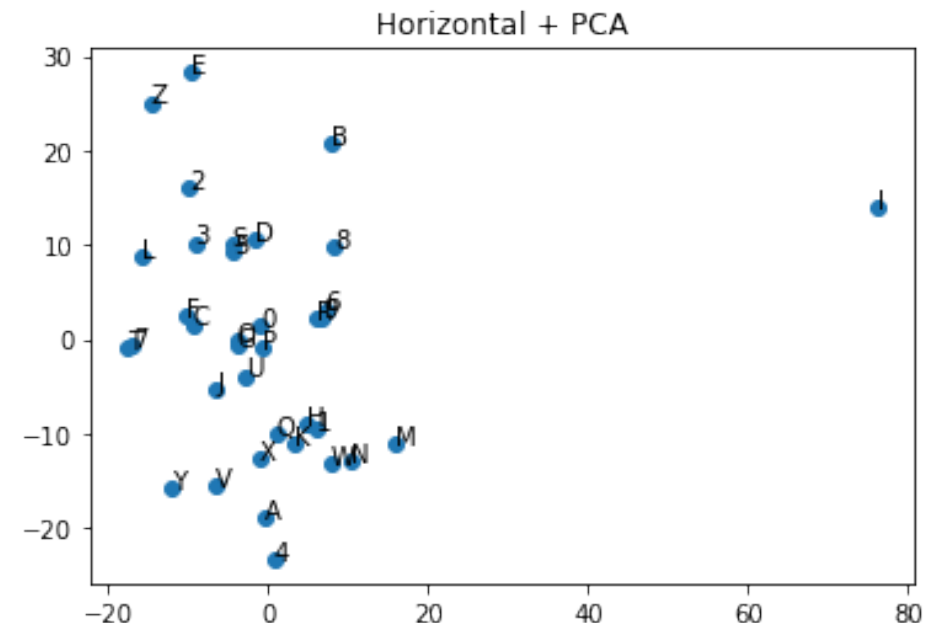
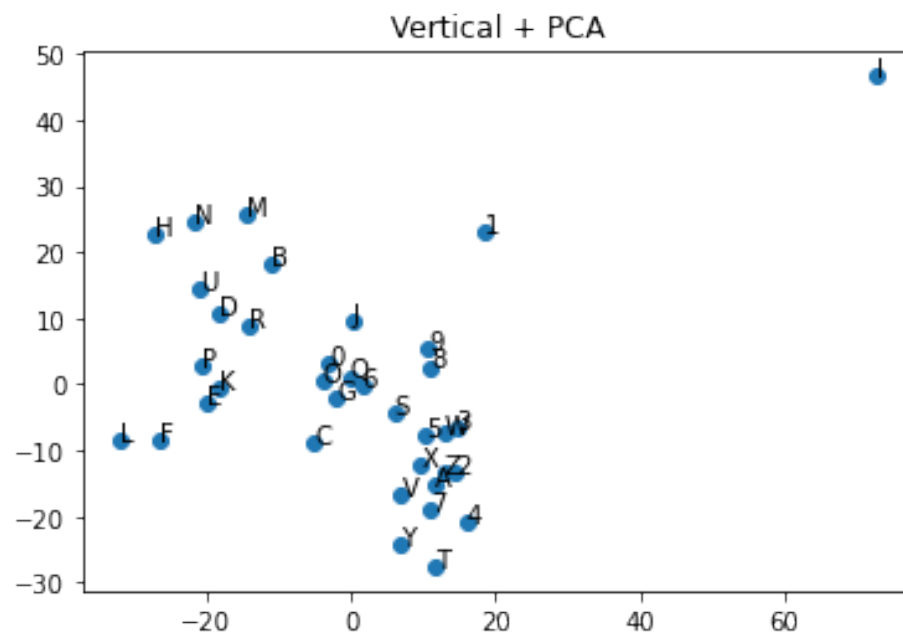
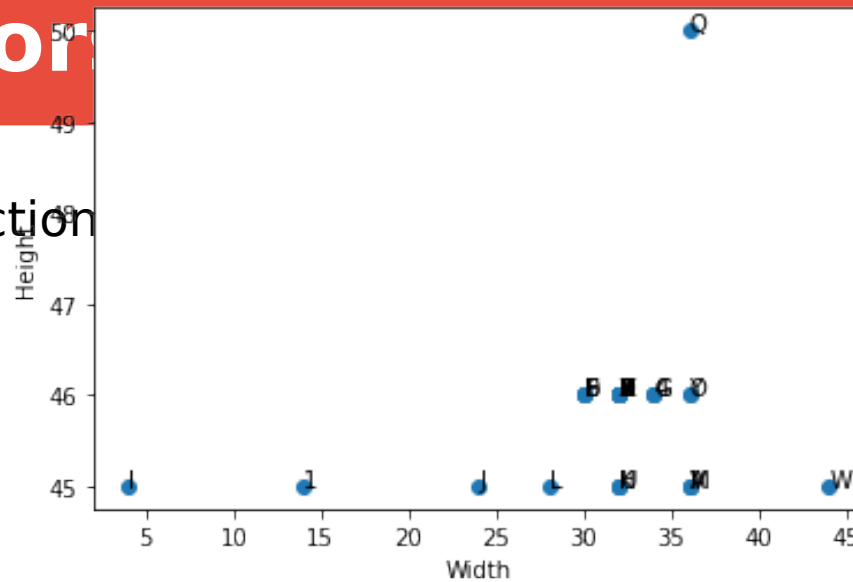
# Image Descriptors

- Vertical and Horizontal Projection



# Image Descriptor

- Vertical and Horizontal Projection



# Let's Code!!

- [Link](#)

# Didactic Quality Questionnaire

- Let me know your thoughts about
  - Lectures, Didactic, Materials and Professor



<https://forms.office.com/r/yK53Mf9W0L>